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ABSTRACT

In establishing a framework for observing and interpreting the interplay among students accumulating knowledge, their intellectual growth, and their ability to express ideas in writing, it is useful to consider the major stage theories and analyze their place in student writing. In general, cognitive stage models describe logical and psychological progressions of qualitatively different stages or positions, each characterized by a unique way of understanding a particular aspect of the environment. Of Piaget's major stages, the concrete/formal progression is most relevant for college thinking. Of Kohlberg's six-stage model, the fourth, fifth and sixth stages, in which the child learns to consider perspectives other than its own, are most relevant. Perry's theory of epistemological development contains nine major positions, which when clustered into four general categories are useful in regard to college thinking. Students developmentally accept a more pluralistic world-view in the college atmosphere, partially because of its demands for thinking, discussing, and writing within a relativistic context. Because writing and the development of reasoning abilities seem to be related, both wiser use of writing throughout the curriculum and instructional design technology based on optimal developmental matching could stimulate intellectual growth in the next generation of learners. (CRH)

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# DEVELOPMENTAL PERSPECTIVES ON WRITING AND INTELLECTUAL GROWTH IN COLLEGE

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May, 1984

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# DEVELOPMENTAL PERSPECTIVES ON WRITING AND INTELLECTUAL GROWTH IN COLLEGE *

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"I worked on this paper all week--how come I only got a C-?"

"No matter how clearly I try to express myself in term papers I can't seem to please the prof."

"I don't think it's fair that professors grade students on opinion. When it comes to stuff where no one knows the answers, one opinion's as good as another--so how can they give us a grade?

"I think I've about figured out what you have to do to get a decent grade around here. Just give the prof some ideas on one side, then give her a few on the other side, come up with some kind of snappy conclusion--they love it!"

Any professor who has used position papers, term papers, essay exams or other writing assignments requiring high-level thinking has heard (or overheard) comments like these. I first encountered them as a teaching assistant in a developmental psychology class at a large urban university where my fellow t.a.'s and I were taken completely by surprise at these challenges to our budding authority. I was probably more surprised than most, since in all my years as a reader for high school English classes I had never encountered complaints of this nature. Their meaning eluded me until a thoughtful professor, sensing a "teachable moment," lent me his copy of William Perry's now-classic book, Forms of Intellectual and Ethical Development in the College Years. That book initiated a long journey toward understanding the educational implications of my discipline, in particular, the theories of Jean Piaget, Lawrence Kohlberg, and William Perry. These models have provided me with a framework for observing and interpreting the interplay between students' accumulating knowledge, their intellectual growth, and their ability to express their ideas in writing. This paper attempts to communicate some of that framework for faculty interested in helping their students find significant meaning in the college experience.

The paper begins with a brief summary of the major stage theories followed by an analysis of their expression in student writing. I will then describe two



*Forthcoming in To Improve the Academy, Laura Wilson, Editor.

central developmental processes, equilibration and decentration, and explore their implications for writing and intellecual growth.

## PIAGET'S THEORY OF COGNITIVE DEVELOPMENT

Piaget's work on cognitive development provided the foundation and inspiration for both Kohlberg's and Perry's theories. In general, cognitive stage models describe logical and psychological progressions of qualitatively different stages (Piaget and Kohlberg) or "positions" (Perry), each characterized by a unique way of understanding a particular aspect of the environment. These stages or positions can be thought of as cognitive, epistemological, or moral "lenses" which affect how experience is interpreted and which are in turn shaped by experience. The lenses evolve from simple to complex, concrete to abstract, and egocentric to empathic and relativistic.

Piaget gives us a theory of development of cognition, culminating in the ability to reason in abstract, symbolic, and hypothetical terms. Of Piaget's four major stages, the concrete/formal progression is most relevant for college teaching. Concrete thinking, characteristic of children and (despite Piaget's age estimates) many adolescents, enables mental manipulation of concrete objects and events, and simple relationships among them (for example, serial or chronological ordering; or classification) but not of ideas, principles, or relatonships between propositions. Thus in concrete operations an individual may be able to classify various animals but will have trouble organizing a series of ideas into a logical sequence or hierarchy--a paragraph or an outline, for instance.

Although the concrete thinker has shed the total egocentrism of early childhood, in that "he no longer confuses his thinking with that of others," (Piaget, 1968, p. 39), he or she still has difficulty imagining the psychological world of others in any detail. When writing, concrete thinkers will have difficulty considering the needs of an audience unlike themselves; they may be able to describe a series of events but will be unable to interpret the events

within an appropriate context. They will have trouble discussing abstract ideas, preferring to use lists of concrete nouns, remain almost exclusively at the level of particulars, and focus on themselves as subject even when the topic demands a larger perspective (Lunsford, 1980).

In the formal operations stage of cognitive development, thought becomes systematic, abstract, general, and hypothetical. Formal reasoning enables one to reflect upon one's own thought and that of others, and hence to consider implications of ideas and to identify contradictions between them. In Piaget's terms, there is "a decentering of the initial egocentric point of view in order to place it in an every-broader coordination of relations and concepts" (Piaget, 1968, p. 69). Formal reasoning enables students to understand anecdotes as examples of general principles. It renders subtle humor and irony accessible. Individuals who have reached this stage can "read between the lines," speculate, interpret, project; for example, they can infer the theme of a story where the concrete learner will simply reconstruct the plot. In science, formal thinking allows experimentation through systematic control of variables (Inhelder & Piaget, 1958); in writing, it allows the writer to stay on the topic. In mathematics, proportional reasoning (relationships between ratios) is evidence of emerging formal operations; in writing, a comparable task might be the use of metaphor and analogy.

Although Piaget originally described formal operations as characteristic of adolescent thought (Inhelder and Piaget, 1958), recent research indicates that in fact formal operational thinking is relatively uncommon, even among college-bound youth and adults. At the college level we see students using reasoning characteristic of both the third (concrete operational) and the last (formal operational) stage in Piaget's developmental sequence, as well as students who appear to be in transition between the two (Arons, 1976; Carpenter, 1980; McKinnon, 1976; McKinnon & Renner, 1971).

KOHLBERG'S THEORY OF MORAL DEVELOPMENT AND GILLIGAN'S CRITIQUE

Formal operations appear to be the cognitive prerequisite (necessary but not sufficient) for the universal, abstract thinking our next theorist, Lawrence Kohlberg, suggests is the "highest" developmental level in the domain of moral reasoning (Tomlinson-Keasey, 1974).

Kohlberg (1969) describes a series of six stages in the development of reasoning in response to hypothetical moral dilemmas. Should Heinz steal the drug from the greedy pharmacist to save his wife's life? Should the citizen report the whereabouts of a man he recognizes as a thief, who in the years since commiting his crime has become a respected citizen in another town?

Despite their soap-opera quality these dilemmas effectively evoke reasoning which Kohlberg has categorized into three "levels," each subdivided into two "stages." In the first two stages, or pre-conventional level, reasons are based on immediate gains to the self. In the second, conventional level, moral decisions are rationalized on the basis of desires and needs of others, first in terms of what will win social approval (stage 3), and later in terms of society's expectations as exemplified in the legal system (the "law and order" frame of reference of stage 4).

At the post-conventional level, what <u>is</u> (the law) becomes differentiated from what <u>ought to be</u> (principles such as fairness, justice, honesty, etc.) (Kohlberg, 1970). The PROCESS of law-making is distinguished from the outcomes, and in many societies, mechanisms for changing unjust practices are built into the "social contract" (as is the case with the U.S. Constitution). Systems of law, values, and ideology are recognized as, to some extent, dependent upon the cultural context which generated them. However, Kohlberg has made the strong claim that there are "absolute," universal principles and human rights which underlie our sense of what is "right," and that value judgments based on an appeal to these abstract principles represent the highest form of moral reasoning, stage 6 in his model (Kohlberg, 1970). The most common reasoning among

college freshmen and sophomores is Level II, with stage 5 reasoning increasing during college.

Drawing on Piaget's concept of egocentrism, Kohlberg views moral reasoning as based on an increasingly abstract concept of the "other." Initially limited to her own immediate perspective, the child learns to consider the perspectives of those close to her, later of those in her immediate social group, and still later in society as a whole (at approximately stage 4). Ultimately, the perspective is a universal one, transcending the relativity of any one culture and taking into account all relevant points of view. This process of "decentering" has important implications for writing, which we will return to later.

An important modification of Kohlberg's theory has been proposed by Carol Gilligan (1982), who conducted interviews with women who were contemplating abortions. She found that their decision-making was based on issues of personal responsibility and the need to balance caring for self and others rather than on general principles and rights. She argues that judgments based on the concerns, needs, and circumstances of individuals and groups affected by a decision are as mature as those based on rights and principles, even though they take "concrete" aspects of the situation into account, and may therefore be scored at the conventional level in Kohlberg's original scheme.

The ability to speculate about the possible consequences of a decision requires hypothetical reasoning, a characteristic of formal operational thinking which, as Tomlinson-Keasey (1974) has demonstrated, is associated with post-conventional reasoning. And in fact, Gilligan found examples of women who considered the situation in addressing their own dilemmas yet also used post-conventional reasoning when responding to Kohlberg's hypothetical moral dilemmas. Note that analysis of the social situation presupposes a highly decentered perspective on social/moral concerns.

The reasoning described by Gilligan is also <u>contextual</u> in nature; that is,

it takes into account the circumstances and setting in which a particular decision resides. Contextual reasoning represents the major intellectual achievement of the college years in the model described by William Perry. A closer look at this influential theory will illuminate the student responses quoted at the beginning of this paper.

## PERRY'S THEORY OF EPISTEMOLOGICAL DEVELOPMENT

Perry (1970) chronicled the development of relativistic thinking and the ability to commit oneself to a course of action in a relativistic context. He conducted two four-year longitudinal studies of Harvard students in the late 1950's and early 1960's. From extensive interviews, he and his associates formulated a stage model describing the progression of students' beliefs about the nature, structure and origins of knowledge, the role of authority in defining knowledge, and students' own relationships to it as they formulated their world-views and their identities. Subsequent work has confirmed the model in a variety of settings and for women as well as men (see especially Clinchy and Zimmerman, 1981). Although Perry describes nine major epistemological positions plus two alternative pathways, we will cluster the positions into four general (and extremely oversimplified) categories. An abbreviated but detailed summary of the full scheme is available in Perry (1981).

The earliest level described by Perry is termed Dualism. Dualism is characterized by complete faith in Authority; Truth is believed to be clear cut and absolute. Knowledge is perceived in simple, either-or terms; Authorities and Experts dispense the facts, rules, and procedures which are the sum total of knowledge. In college, the Authorities are the professors, and it is their duty to pass on their knowledge to the students. The student's responsibility is to absorb the knowledge and recreate it as accurately as possible when asked to do so on a paper or test. Correctness and quantity are valued in this early position; objectivity resides solely in facts. This student wants The Answers; he or she views knowledge strictly as product, with no sensitivity to the

processes that went into its creation. It is the tendency to view the world in absolute, binary terms that led Perry to label this level "Dualism."

Dualistic students tend to use absolute language, to have difficulty understanding complex causal relationships, and to perceive their lives as externally controlled; they are also not particularly open to views different from their own, and tend to protect their egos when faced with risky situations (Knefelkamp and Slepitza, 1976). Few of Perry's subjects were dualistic when first interviewed at the end of their freshman year, though many described themselves as having been this way "B.H." (Before Harvard).

Dualism is in many ways antithetical to learning (other than rote memorization) as well as to good thinking and therefore to good writing, since it admits/invites little elaboration and precludes appreciation of the process of constructing knowledge. When information is presented, the dualistic student will record it dutifully in her notebook; but when asked to "think about it," discuss it, or write about it, she will be at a loss, for these tasks (to the extent they are understood at all) are the teacher's responsibility, not the students'. Furthermore, when various points of view on a topic are presented, the student easily becomes confused, since he assumes there is only one "correct" version of the subject; why mess with others that are incorrect or of merely historical interest? Shades of grey do not fit into a binary structure; thus fine points are generally lost on this type of student. Or details may be recorded and given equal status with major generalizations, since all are equally validated by the Authority's attention to them in lecture or readings.

Dualistic students' writing will manifest little sense of another's world as differentiated from the writer's, so there is little need (from the writer's point of view) to articulate details or assumptions that clarify his or her frame of reference. To do this I must grasp that I HAVE a frame of reference; but at this level of development, I AM my frame of reference, for it is largely unquestioned. Thus for instance, when asked to argue a position on a

controversial topic (as in Janice Hays' studies), dualistic students are likely to make unsupported assertions, rely on anecdotes or extended examples to support their claims, use a fairly emotional, even blaming tone, and progress from idea to idea with little concern for the audience's needs (Hays, this volume; see also Hays, 1983).

The Dualist's intellectual Garden of Eden tends to fade in the college setting, however, as students discover theory, uncertainty, and disagreement among authorities. If facts are not Facts, then what is true and correct? In Perry's second group of positions, referred to as "Multiplicity," students begin to question "Authority." The second and third opening quotes illustrate how evaluation of students' written ideas can become a major source of uch questioning. The student discovers that learning is not simply a matter of obtaining and memorizing right answers, since some knowledge is controversial, uncertain, or as yet unknown. This uncertainty may be used to defend the frequently heard view that one opinion is as good as another, "since no one knows for sure." Early on in this level, the student may assume that written work is graded on such mysterious intangibles as "style" or "expression"; later, "bias" on the part of the instructor (agreement or disagreement with the students' views) may be used to explain an unfavorable grade assignment.

Thus while authorities admit many views, they continue to evaluate and to grade and to endorse particular views as their own. Bewildered at first by this apparent contradiction, students benefit from feedback and from challenges to explain or justify their views. Gradually they may recognize that opinions can be compared on the strength of the arguments used to support them.

A transition becomes possible when the student observes that balancing "opinion" (or theory) with factual evidence wins rewards in the form of good grades, at least from some instructors. Such experiences foster the development of a more mature concept of objectivity. Gradually the student comes to understand knowledge as a constructive process in which authorities engage in a

(probably never-ending) effort to understand and master their corner of the world. Knowledge is a function of its context or the point of view from which the matter is viewed; learning is seen as an active process requiring a partnership between the learner and the teacher, who helps by creating conditions conducive to learning. And although everyone is entitled to his or her own opinion, some opinions clearly ARE better than others, since they are more logical, better supported by and consistent with evidence, comprehensive, or congruent with other appropriate criteria which can be agreed upon by reasonable people. This set of positions is termed "Relativism."

Relativistic students will appear far more mature to their professors than Dualistic or Multiplistic students do. They have begun to develop a sense of control over their own lives, and hence will deal with their assignments and concerns more responsibly. They will be more tolerant and inclined to take risks. (Knefelkamp and Slepitza, 1976).

The epistemological stance here is identical to that of the next level, "Commitment in Relativism," but the individual has not yet considered and wrestled with the need to make significant commitments in the context of a world where all knowledge -- including self-knowledge -- is dependent on one's frame of reference. Thus in their writing, they may use or overuse qualifiers and modifiers; they may compare and contrast skillfully but equivocate endlessly when it comes time to take a stand. They are also likely to show considerable awareness of themselves as writers in taped protocols of the writing process such as those reported by Hays in this volume.

Perry's most advanced subjects committed themselves to values and life choices in spite of their realization that all such choices were based on a necessarily limited understanding of their own situation and the world in general, and their often explicit recognition that no one (except perhaps, themselves) could ultimately certify their commitments as "right." Here the individual learns to express her values through commitments based on rational

analysis rather than on custom, parental expectation, or whim. While both the first and the fourth positions suggest firm stances and definite choices, they differ in that Commitment in Relativism presupposes recognition of the many possibilities and "roads not taken," and hence generates a more tolerant and understanding response to others who are different or who have made different choices.

Studies in a variety of college settings strongly suggest that many students hold late dualistic or at best early multiplistic (positions 2 and 3 on Perry's 9-point scheme) views upon entering college, and many do not reach the higher two levels even by graduation (Kitchener & King, 1981; Mentkowski, Moeser, & Strait, 1983; Strange & King, 1981). Yet the world-view of contextual relativism is implicit in the goals of most institutions and in many of the more demanding tasks we assign our students to perform. In fact, many aspects of the higher levels of all these theories overlap considerably with commonly stated goals of higher education--from tolerance for cultural diversity to problem-solving ability and ethical maturity (Chickering, 1980). It is equally apparent that attainment of these goals is often monitored through written assignments. We have already seen how these world views are reflected in students' writing; what can be done to improve the outlook for both writing and development?

## DEVELOPMENTAL PROCESSES

To improve writing at any stage, we must first or at least simultaneously deal with the cognitive structure and attempt to overcome the limitations it imposes. This will require some sense of how development takes place.

Developmental theory suggests that we develop when confronted with the inadequacies of our present knowledge structures or beliefs. Development results from our efforts to reconcile discrepancies between belief and experience--a process Piaget (1968) termed "equilibrium," or "self-regulation." In most college environments, dualistic beliefs about goodness, truth, and authority are constantly contradicted. For example, students fresh from a homogeneous

environment encounter "good" people whose beliefs differ radically from their own--who may even be atheists or democrats--forcing them to disentangle personal characteristics of others once linked together in stereotypic clusters. Similarly, students are frequently asked to write examinations and papers comparing two apparently equally valid points of view on a topic even when the instructor has remained poker-faced when asked to state her preference.

The comments quoted at the beginning of this paper illustrate an important develpmental concept: The learner's developmental level interacts with the structure or demands of the learning environment. That is, the student's epistemological level influences her interpretation of the situation and hence her response to it. Obviously some combinations will be more frustrating or productive than others; developmental theory holds that the optimal level of challenge is one "stage" or position above the students' present level. Translated into specifics, this means that when a professor teaches authoritatively to dualistic students, minimum equilibration occurs (teaching high school students to use the five-paragraph essay "formula"). Professors who constantly ask students why they hold a particular view, and who take those views seriously, provide the type of challenge that can facilitate transition from Multiplicity to Relativism. But when professors talk Relativistically to Dualistic students, the result will almost certainly be a flood tide of complaints and questions such as "Which one is right?" or "Which one are we supposed to know for the exam?" Dualistic thinking may explain some students' negative reaction to class discussion or small group activities where the security of receiving knowledge direct from the Authority is removed.

While some confusion may be constructive, a mismatch can have serious consequences, as in the case of a class described by Stern and Cope (1956). Unbeknownst to the teaching assistant handling two sections of a course designed to teach critical thinking, students were grouped according to their scores on a measure similar to Dualism. High scoring students responded dramatically to the

course. Rather than address controversial issues relativistically, they used the critical thinking tools of the course to seek evidence in support of their initial positions, and defended those positions in a manner described as "internecine warfare" by the unsuspecting t.a. Students in another section, who scored low on the measure, had no difficulty with the course.

The "optimal match" for encouraging development is about a 50-50 mix: familiar enough to be recognizable, yet novel enough to be puzzling or interesting. In terms of Perry's model, this would mean helping the dualistic student understand and accept the possibility of multiple frames of reference, perhaps through exercises requiring reading or listening to, and then summarizing a variety of opinions on a topic, emphasizing accuracy in reporting the evidence used to support each view and in clarifying relationships between main points and subordinate ideas. Journal writing would provide a complementary outlet for students' emotional responses to course material and its intellectual demands. Similarly, development beyond Multiplicity is facilitated in a setting that emphasizes "why" questions, gradually becoming more insistent on a well reasoned, documented rationale for a position held, helping the student differentiate between a position and the argument for that position.

Because efforts to encourage development may provoke feelings of anxiety, an open, supportive classroom environment is desirable to help students risk accepting the challenges posed to their accustomed ways of thinking. Practice in using emerging intellectual abilities, and feedback (not simply grades) from both the teacher and other students, will also help attenuate the risks involved. For students at all levels a sense of participation in a community of learners enhances motivation and enables them to construct shared meanings (Bruffee, 1983).

From a developmental perspective, then, meaningful analysis of a learning experience is not in terms of content alone. Rather, it is in terms of epistemological assumptions inherent in the task or environment. Once those are

identified and categorized, one can assess whether or to what degree the student is capable of responding appropriately, and what preparatory activities are most likely to help the student come to grips with "what the professor really wants." And while most students will probably survive whatever their professors throw at them, a consciously sequenced approach can increase the probability that our students will "hear" what we have to say.

## THE INTERDEPENDENCE OF WRITING AND INTELLECTUAL DEVELOPMENT

As the foregoing discussion suggests, one of the ways in which the college environment pressures students to accept a more pluralistic world-view is through its constant demands for thinking, discussion, and writing within a relativistic context. Perry found that over the 50 years preceeding his studies, the proportion of relativistic exam questions answered by students rose dramatically (1970). And as most educators know, examinations are powerful determinants of student's study behavior (Chickering & McCormick, 1970). One could easily argue, in fact, that students' emerging relativistic world-views are "shaped" by reinforcement.

But a reinforcement hypothesis explains only part of the process. As noted earlier, decentering is a process of understanding the world from the point of view of others; equilibration is the reconstruction of one's thinking to take into account new, discrepant information. In class discussion, group work, and writing, students learn to consider the needs of readers, to persuade, coax, ingratiate, and interest them; they delve beneath the surface of the words in their texts to discover their implications. Thus it is not simply that students are "rewarded" for thinking and writing relativistically. They are learning to respond to and interact with the ideas of others, to take into account diverse ways of thinking, to accept and confront differences, and to rework their thinking to incorporate more possibilities and perspectives. From this point of view, it is no surprise that students in residential settings, where dialogue

about course material and other topics is an integral part of daily life, attain greater development than students who commute to college (Chickering, 1974). Conversation with peers and faculty, and feedback on papers and essay exams together appear to be highly effective in the construction of a relativistic world-view.

This is understandable when one considers the interdependent relationship between writing and thinking. Over the years I have labored many hours over student writing, not only because I want them to "write better," but also because I believe that the dialogue established when I respond to what my students have written is a vital element in their intellectual and personal development. Any writing task, taken seriously, compels the writer to think through a problem to some degree. The built-in challenge of the writing task is supported by the comforting concreteness of the marks on the page, and eventually the discoveries that are made possible by the attempt to translate unarticulated impressions into communicable ideas. Writers, even novice writers often report making discoveries about the subject, seeing new relationships, and deepening their understanding through the writing process (Emig, 1979; Irmscher, 1979). Ungraded writing is particularly helpful for students as yet uncomfortable with the formalities and demands of academic prose; it enables them to try out ideas, test their understanding, prepare for more complex tasks, and master course content (see Barry, this volume, for examples).

Conversely, to think through any idea thoroughly, most of us find it almost impossible to make progress without some written record of our thoughts. Having made such a record, we are in a better position to evaluate our own thinking, to tamper and experiment with it, and to pursue its further implications without fear of losing the original concept.

Finally, writing for realistic audiences or a peer audience (as described in Lois Barry's paper in this volume) encourages students to consider the effects of their words on other people--that is, to imagine how their writing will be

understood by the reader. Referred to in literature on the development of writing as "audience awareness," this skill is closely related to decentering, discussed in connection with Piaget's, Kohlberg's and Gilligan's theories. Assignments which require multiple perspective-taking encourage students to focus their attention on the needs of specific audiences and can help them develop the more abstract concept of a "general reader" audience as well.

Decentration is a natural pivot point in the development of both cognition and writing ability. A recent study of fourth graders' writing supports this view. The authors found a strong correlation between perspective-taking ability and quality of narratives written by fourth graders, measured independently (Rubin, Piche', Michlin and Johnson, 1984). And work supervised by Janice Hays links writing quality and audience strategies in high school and college writers (Maddox, 1983).

Despite the difficulties and challenges involved, I can only conclude no student should be deprived of the potential benefits of extensive, varied writing experience.

Writing may well be essential for the development of high levels of abstract, hypothetical, and relational reasoning. Although Piaget viewed language as a necessary but not sufficient condition for development of formal thought, he states unequivocally that "Without language the [cognitive] operations would remain personal and would consequently not be regulated by interpersonal exchange and cooperation" (Piaget, 1968, p. 98). The use of written language, particularly in a mode of communication or discovery, can only serve to extend the power of language as an aid to the development of thought. The hypothesis certainly deserves attention. Applebee (1981) reports that in public school, students spend less than 3% of their time writing anything longer than a paragraph. What they do write tends to make few demands on their capacity for thinking and response. At the same time, we are seeing a dramatic decline in reasoning and communication skills of students. It does not seem unreasonable

to consider these two phenomena to be related.

The lack of everyday, routine use of writing by students, and hence the lack of a consistent, continuing demand for thinking in any depth about a topic, may well be the major contributor to the skill deficits we see in both writing and reasoning of students. Furthermore, when writing is required, it is generally for purposes of evaluating what students have already learned, rather than to help them master new material, integrate it into their own thinking, or discover significance within it. Without the tool of writing, and with the predominance of testing that emphasizes short-term memorization, it should come as no surprise that whatever students do learn in the classroom has little carryover to later achievement tests. But perhaps the final and most devastating consequence of our present practices with respect to writing is that students come to fear and dislike writing (or at least "school writing"), thus depriving themselves of a potential source of satisfaction, learning, and efficacy.

Students' intellectual development is fostered in an environment that encourages a dialectical interplay between reading, listening, speaking, and writing, all in the service of learning and thinking about what is learned. While the details of the relationship between writing and the development of reasoning abilities are currently the object of much study, it is safe to say that they are closely interrelated and mutually supportive processes, and that we neglect powerful opportunities to nurture students' intellectual capacities when we relegate writing to a back seat in the learning process. Coupled with an instructional design technology based on optimal developmental matching, wiser use of writing throughout the curriculum could stimulate intellectual growth in the next generation of learners at all educational levels.

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